
1. Module details

Module name

CFC RETROFITTING

Nominal duration

Half module

It is anticipated that students will achieve the competencies specified in 18 to 20 hours.

Module codes

NR038

Discipline code

2. Module purpose

To provide the student with the knowledge and skills to select appropriate replacement refrigerants and carry out the retrofitting procedures in line with current legislation and codes of practice.

3. Prerequisites

Nil

4. Relationship to competency standards

TBA

5. Content

1. System analysis:

- CFC phase out
- equipment usage audit
- refrigerant usage audit
- review options
- refrigerant management program

2. Refrigerant selection:

- ANSI/ASHRAE standard 34
- transitional refrigerants
- medium and long term refrigerants
- refrigerant selection considerations
 - environmental properties
 - refrigerant compatibility
 - performance characteristics
 - safety
 - availability
 - cost
- handling refrigerants
- reclaiming, recycling or reprocessing used refrigerants
- lubricant selection
- compatibility

3. Retrofit procedure

- equipment compatibility
 - compressor
 - condenser and evaporator
 - expansion device
 - pipe work

- controls
- desiccant
- flushing procedures
- retrofit procedure for CFC to HCFC refrigerant
- retrofit procedure for CFC to HCF to HFC refrigerant

6. Learning outcome details

Learning outcome 1

On the completion of this module, the learner will be able to:

Analyse the operation of existing refrigeration systems and make recommendations for retrofit or replacement based on the system analysis.

Assessment criteria

Assignment

- 1.1 Prepare a system analysis for 3 different refrigeration or air conditioning plants identifying equipment, capacity, current refrigerant, lubricant and other factors that may impact on decision making.
- 1.2 Prepare a refrigerant usage audit and review of options and make recommendations for a refrigerant management program.

Learning outcome 2

Select appropriate refrigerants and lubricants for the selected equipment based on the system efficiency and financial viability of the equipment.

Assessment criteria

Short answer test.

- 2.1 Differentiate between transitional and medium to long term refrigerants.
- 2.2 Explain the terms ODP, GWP, EAL and TEWI.
- 2.3 Compare refrigerant properties such as boiling point, evaporating and condensing pressures, compression ratios, COP and temperature glide.
- 2.4 Identify safety characteristics and safe handling criteria of various refrigerants.
- 2.5 Explain the approved system for reclaiming, recycling or reprocessing used refrigerants.
- 2.6 Select appropriate lubricant for specified refrigerants and applications, bearing in mind possible compatibility problems with plastics and elastomers.

Learning outcome 3

Prepare a retrofit procedure for selected equipment complying with manufacturers' recommendations and codes of practice.

Assessment criteria	Assignments.
	3.1 Prepare retrofit procedures for selected plant covering both CFC to HCFC and CFC to HFC refrigerants.
7. Assessment Strategies	For consolidation, the material in this module should be linked with and complemented by relevant on-the-job skill practice or other equivalent experience.
8. Module Delivery Strategies	This module may be taught by active participation, integrated practice and theory, illustration, demonstration and description with as much scope as possible for individual research within the industrial environment.
	The following supplementary practice should be applied where practicable:
	<ul style="list-style-type: none"> - familiarisation with safety and environmental issues specific to the industry.
9. Resource Requirements	Suggested learning resources:
	<ul style="list-style-type: none"> - Access to commercial refrigeration or air conditioning plant - refractometer for demonstrating the testing of oil samples - manufacturers' equipment catalogues and retrofit information - AIRAH CFC Phase Out Guide - AIRAH CFC Application Training Guide
	Human Resources:
	<ul style="list-style-type: none"> - Course presenters should, as a minimum, have a recognised trade or engineering qualification within the HVAC Industry, with accreditation to handle CFCs.
10. Occupational health and safety requirements	Learners must be made aware of all relevant OH&S issues in all situations and are required to demonstrate safe working practices at all times.
	All work areas must comply with current OH&S legislation.